

## ABSTRACT

A new oligomer based on alternating fumaric acid and poly(ethylene glycol) (PEG) units is provided. The oligo(PEG fumarate) (OPF) may be functionalized by modification with a biocompatible organic group. Further, the OPF may be cross-linked using radical polymerization in the presence of either a chemical or photo initiator. A cross-linked OPF gel has a swelling behavior that is tunable dependent on the molecular weight of PEG. A cross-linkable PEG macromer, as exemplified by oligo(PEG fumarate), has unsaturated double bonds, for example in the fumaryl groups, along its macromolecular chain that allows for the preparation of hydrogels with tailored structure and properties.